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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER
PUNNOOSE, ROY M

ART UNIT	PAPER NUMBER
2877	

DATE MAILED: 01/26/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/684,361	DREVILLON ET AL.	
	Examiner	Art Unit	
	Roy M. Punnoose	2877	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 March 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,6,7,15-17,25 and 26* is/are rejected.

7)☒ Claim(s) *2-5,8-14 and 18-24* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *15 October 2003* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *10/15/2003*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Pre-Amendment

2. Receipt of the pre-amendment filed by the applicant on October 15, 2003 is acknowledged and has been entered into the records.

Specification

Arrangement of the Specification

3. As provided in 37 CFR 1.77(b), the specification of a utility application should include the following sections in order. Each of the lettered items should appear in upper case, without underlining or bold type, as a section heading.

(a) TITLE OF THE INVENTION.
(b) CROSS-REFERENCE TO RELATED APPLICATIONS (if applicable).
(c) BACKGROUND OF THE INVENTION.
    (1) Field of the Invention.
    (2) Description of Related Art including information disclosed under 37 CFR 1.97 and 1.98.
(d) BRIEF SUMMARY OF THE INVENTION.
(e) BRIEF DESCRIPTION OF THE DRAWING(S).
(f) DETAILED DESCRIPTION OF THE INVENTION.
(g) CLAIM OR CLAIMS (commencing on a separate sheet).
(h) ABSTRACT OF THE DISCLOSURE (commencing on a separate sheet and not more than 150 words).

4. Several section headings are missing in the specification of the instant application.

Appropriate correction is required.

Drawings

5. The drawings are objected to under 37 CFR 1.83(a). The drawings must show **every feature** of the invention specified in the claims. The following features are not shown in the drawings:

a. The direction of polarization **(i)** as claimed per claim 1 (see line 6);

b. The ordinary and extraordinary axes as claimed per claim 1 (see lines 17-18);

c. The extraordinary axis making an angle θ_j with respect to the direction of polarization **(i)** as claimed per claim 1 (see lines 15-16);

d. The orientation angles θ'_j and θ_j as claimed per claim 1 (see line 21);

e. An electronic control unit as claimed per claim 2 (see line 4) and claim 3 (see line 4);

f. The monochromators, as claimed per claim 11 (see line 3) and claim 12 (see line3).

Therefore the above listed features/limitations must be shown in the drawings, or canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the

renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

6. Claim 1 is objected to because of the following informalities: The applicant has used parenthesis liberally and for different purposes. For example, parenthesis are used for representing reference characters in the drawing(s), the direction of polarization (see line 6), for acronyms (see lines 11 and 12) as well as for characterizing the limitations/elements of the claim (see lines 13-17). This has created clutter and confusion in the claim. Appropriate correction is required.

Note: The Applicant in requested to review all the remaining claims for reasons of objection similar to that used above for claim 1 and make appropriate corrections.

7. Claim 4 is objected to because of the following informalities: The bullet (a hyphen character) on line 11 creates the perception of missing limitations/features of said claim. For examination purposes, it is assumed that the "-" bullet is an error. Appropriate correction is required.

8. Claims 5, 6, 21 and 25 are objected to for similar reasons of objection of claim 4 above. Claims 5, 6, 21 and 25 have the same type or error as claim 4, except for the use of different characters ("o" in claim 21 and "•" in claim 25) for bulleting. The Examiner suggests that the

applicant use the same type of bulleting in the application for the sake of consistency, clarity and better presentation. Appropriate correction is required.

9. Claim15 is objected to because the language used to claim the limitations is inappropriate. The Examiner suggests replacement of "one illuminates" (on line 3) with "illuminating", replacement of "one detects" (on line 8) with "detecting", and replacement of "one processes" (on line 11) with "processing" to better present applicant's claimed invention. Appropriate correction is required.

10. Claim 16 is objected to because of the following informalities: The reference sample is claimed as a process step of propagation (in air). A more accurate presentation of the claimed subject matter would be "… reference sample being air" instead of "… reference sample being propagation in air". Appropriate correction is required.

11. Claim 18 is objected to because of the following informalities: The word "describing" (in lines 8 and 16) is not proper. The Examiner believes that its replacement with "representing" would better present applicant's claimed invention. Appropriate correction is requested.

12. Claim 26 is objected to because from the recitation "collecting the raw data matrix B according to claim 25" it appears that claim 26 is dependent only on a part claim 25 that is relevant to collecting data. Any claim which is in dependent form but which is so worded that it, in fact, is not a proper dependent claim, as for example it does not include every limitation of the claim on which it depends, will be required to be canceled as not being a proper dependent claim (see MPEP 607).

Claim Rejections - 35 USC § 112

13. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

14. Claims 1, 6-7, 15-17 and 25-26 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

15. Claims 1 and 15 are rejected because from the recitation of "reverse order" (line 19 of claim 1, and line 28 of claim 15), it is not clear if said "reverse order" is with regard to rotation, angular orientation or placement of each liquid crystal elements. This has made the claim vague and indefinite. For examination purposes, it is assumed that the PSD liquid crystal elements' placement is in a reverse order when compared to the placement of the PSG liquid crystal elements, i.e., if the PSG elements are placed in a 1-2 order, the PSD elements are placed in a 2-1 order. Appropriate correction is required.

16. Claims 1 is further rejected because it is not clear what is meant by "(resp. θ'_j)" on lines 15-16 and "(resp.δ'_j)" on line 17 as they are not defined in the specification. This has made the claim vague and indefinite. Appropriate correction is required.

17. Claim 1 recites the limitation "the orientation angles" in line 21. There is insufficient antecedent basis for this limitation in the claim. There is no prior disclosure or recitation of "orientation angles" in claim 1. Appropriate correction is required.

18. Claim 6 recites the limitation "said two FLCs" in line 4. There is insufficient antecedent basis for this limitation in the claim.

19. Claim 7 is rejected because it is not clear from the recitation of "a linear polarizer" (line 5), if reference is being made to the linear polarizer of claim 1 (see line 5 of claim 1), or if it is an additional linear polarizer included in the apparatus. For examination purposes, it is assumed that

the linear polarizer of claim 7 is the same linear polarizer of claim 1 and therefore there is only one linear polarizer in applicant's claimed invention. Appropriate correction is required.

20. Claims 16, 17 and 26 are rejected because of the use of the word "assumed" in line 3 of claims 16, 17 and 26 creates doubt and/or lack of certainty as to the type of sample(s) used in said claims. This has made the claims vague and indefinite. Appropriate correction is required.

21. Claim 25 is rejected because the process step for "producing measured quantities" is presented with confusing and grammatically incorrect language and it is not clear what is being claimed. This has made the claim vague and indefinite. Further, there is no definition for the variables A and W, and for the measured quantities (D_n) in the claim. For the above stated reasons, claim 25 has not been treated on its merits and no prior art search has been conducted because it is not clear what is being claimed.

22. Claim 26 is further rejected because of the use of the word "if" (second line from the bottom) creates doubt and/or lack of certainty as to the type of sample(s) used in said claim. It raises the question as to what if the sample is not a DR? The above stated reason has made this claim vague and indefinite. Appropriate correction is required.

Claim Rejections - 35 USC § 103

23. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

24. Claims 15-17 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Drevillon et al (US_6175,412 B1) in view of Gorman et al (US_4,523,848).

25. Claim 15 is rejected because:

A. Drevillon et al (Drevillon hereinafter) teach a process of a polarimetric system involving the steps of measuring of at least a reference sample 1 (see col.7, lines 60-67) in which one illuminates the sample 1 with a polarized incident light beam 10 emitted by a polarization state generator 3 (PSG) containing a polarizer 20 (see Figure 3), said PSG 3 modulating the light beam polarization (see col.8, lines 1-5 and col.9, lines 45-47), said sample 1 transmits or reflects a measurement beam 12 (see col.8, lines 6-7), one detects the measurement beam 12 with an analysis section comprising a polarization state detector 4 (PSD) containing an analyzer 36-39 (see col.8, lines 7-9 and col.10, lines 56-58), and detection means 4 , and one processes the electrical signals produced by the detection means 4 with a processing unit 40 (see col.8, lines 7-9 and col.col.11, lines 11-14), one modulates the incident light beam polarization, the PSG having a modulation matrix W that is non singular (see col.8, lines 1-5; col.15, line 62; col.16, lines 14-16), one generates a detection matrix A for the analysis section, said matrix being non singular (see col.7, lines 60-67 and col.15, line 63), one produces a measured quantity and the processing unit 40 produces the raw data matrix AMW, where M is the Mueller matrix of the sample 1 (see col.8, lines 9-12; col.15, line 61- col.16, line 7; col.16, lines19-21), for the purpose of calibrating a polarimetric system for improving the accuracy of polarimetric measurement of a sample under test.

B. However, Drevillon does not teach of a polarization state generator (PSG) containing a first and a second liquid crystal elements (LC_1 and LC_2) positioned after the polarizer, said LC_1 and LC_2 elements having retardations between their ordinary and extraordinary axes

and said extraordinary axes making angles with respect to the polarization direction defined by the linear polarizer so that by varying the retardation of each LC_1 and LC_2 elements for a fixed value of the angle, when the LC_1 and LC_2 elements are nematic LCs, or by switching the orientation angle when the LC_1 and LC_2 elements are ferroelectric LCs, and that the polarization state detector (PSD) contains a third and a fourth liquid crystal elements LC_3 and LC_4 positioned before the analyzer, said LC_3 and LC_4 elements being the same as the LC_1 and LC_2 elements of the PSG but positioned in the reverse order, so that by varying the retardation of each element for fixed values of the angles when the LC_3 and LC_4 are nematic LCs, or by switching the values of angles for a fixed angle when the LC_3 and LC_4 are ferroelectric LCs, so that for a given set of retardations or for a given set of orientation angles a measured quantity is produced from which a processing unit produces a raw data matrix, for the purpose of calibrating a polarimetric system for improving the accuracy of polarimetric measurement of a sample under test.

C. Gorman et al (Gorman hereinafter) teaches a process comprising a polarization state generator (PSG) containing a first liquid crystal element 26 (see Figure 3) positioned after a polarizer 24, said liquid crystal element having retardation between their ordinary and extraordinary axes and said extraordinary axes making an angle with respect to the polarization direction defined by the linear polarizer 24 so that by varying the retardation of said liquid crystal element 26 for a fixed value of the angle, wherein the liquid crystal elements are nematic liquid crystal (see col.2, line 66- col.3, line 11), and a polarization state detector (PSD) containing a second liquid crystal element 34 positioned before the analyzer 36, said second liquid crystal element 34 being the same as the first liquid crystal

element 26 of the PSG, so that by varying the retardation of each element for fixed values of the angle so that for a given retardation or for a given orientation angle a measured quantity is produced, for the purpose of calibrating a polarimetric system for improving the accuracy of polarimetric measurements of a sample under test. Gorman further teaches that the apparatus' quarter wave plates 28, 32 may consist of or substituted with activated liquid crystal devices (see col.3, lines 44-47).

D. In view of Gorman's teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate Gorman's process consisting two liquid crystal devices each with the PSG and PSD into Drevillon's calibration process for the purpose of modulating the incident light beam polarization and the measurement beam for having a better control of the precision of the detection matrix in the calibration of a polarimetric system for improving the accuracy of polarimetric measurement of a sample under test.

E. Gorman is silent with regard to the placement of the liquid crystal elements in the reverse order. However, in view of Gorman's teaching of replacing the retarders (quarter wave plates) with LC elements and using two LC elements each with the PSG and PSD, it would have been obvious to one of ordinary skill in the art at the time the invention was made to engage in routine experimentation for the placement of the liquid crystal elements in any order to obtain a desired result in the calibration of a polarimetric system for improving the accuracy of polarimetric measurement of a sample under test.

26. Claims 16 and 17 are rejected for the same reasons of rejection of claim 15 above and additionally because they claim the measurement process taught by both Drevillon and Gorman as

disclosed above to measure the ellipsometric transmission and/or reflection properties of dichroic retarders, air and metallic mirror. In view of Drevillon's and Gorman's teaching as disclosed above, it would have been obvious to one of ordinary skill in the art at the time the invention was made to measure the ellipsometric transmission and/or reflection properties of dichroic retarders, air and metallic mirror by using the process taught by both Drevillon and Gorman.

27. Claim 25 is rejected for the same reasons of rejection of claims 15-17 above and additionally because it is directed to measuring a sample under test using a calibrated polarimeter, wherein the polarimeter is calibrated using the calibration process claimed in claim 15, and using a polarimeter to measure a sample under test requires only common knowledge and is commonly known in the art. Additionally, because the values of the variables B, A and W are known from the measurements, it takes only routine mathematical skill to derive value of M from the formula M= B/(A*W). For examination purposes, it is assumed that A and W are the same variables as that of claim 15.

Allowable Subject Matter

28. Claim1 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action.

29. Claim 1 would be allowable because none of the prior art documents disclose a polarimetric system for analyzing a sample in which the orientation angles of the liquid crystal elements of the polarization state detectors (PSD) are equal to the orientation angles of the liquid crystal elements of the polarization state generator (PSG), and the retardations of the liquid crystal elements of the polarization state detectors (PSD) are equal to the retardations of the

liquid crystal elements of the polarization state generator (PSG), (modulo 2π), in combination with the rest of the limitations of claim 1.

30. Claims 6-7 and 26 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims or if the rejection to the base claim can be overcome.

31. Claims 4, 5, 18 and 21 are objected to for reasons stated in section under "Claim Objections" above. Additionally, claims 2-5, 8-14 and 18-24 are objected to as being dependent upon a rejected base claim. The above listed claims would be allowable if any/applicable reason(s) for objections can be overcome and said claims rewritten in independent form including all of the limitations of the base claim and any intervening claims.

32. Claim 18 would be allowable because none of the prior art documents disclose a calibration process comprising calculating the product $(AIoW)^{-1}(AR(-\theta p)MpR(\theta p)W)$ for each reference sample in order to obtain an experimental matrix (Cp), in combination with the rest of the limitations of claim 18 and its parent claim.

33. Claim 21 would be allowable because none of the prior art documents disclose a calibration process in which the reference samples are chosen according to the following criteria:

a. The 16x16 real symmetrical matrices $K_1(\theta_1)$ and $K_2(\theta_2)$ will only have one vanishing eigenvalue, if and only if the angles θ_1 and θ_2 used for their evaluation are equal to the azimuthal angles of the polarizers during the calibration measurements; and,

b. The next eigenvalues are as large as possible, or, more precisely, the ratios $Z=\lambda_{15}/\lambda_1$ of the smallest nonvanishing eigenvalues (λ_{15}) over the largest (λ_1)

eigenvalues of K_1 and K_2 are as large as possible, in combination with the rest of the limitations of claim 21 and its parent claim.

34. Claim 26 would be allowable because none of the prior art documents disclose an ellipsometric measurement procedure comprising deducing the ellipsometric parameters of the studied sample from the eigenvalues and known parameters τ_0, Ψ_0, and Δ_0 of the calibration sample using the respective equations disclosed in claim 26, in combination with the rest of the limitations of claim 18 and its parent claim.

35. Several facts have been relied upon from the personal knowledge of the examiner about which the examiner took Official Notice in this office action. Applicant must seasonably challenge well known statements and statements based on personal knowledge when they are made. In re Selmi, 156 F.2d 96, 70 USPQ 197 (CCPA 1946); In re Fischer, 125 F.2d 725, 52 USPQ 473 (CCPA 1942). See also In re Boon, 439 F.2d 724, 169 USPQ 231 (CCPA 1971) (a challenge to the taking of judicial notice must contain adequate information or argument to create on its face a reasonable doubt regarding the circumstances justifying the judicial notice). If applicant does not seasonably traverse the well-known statement during examination, then the object of the well known statement is taken to be admitted prior art. In re Chevenard, 139 F.2d 71, 60 USPQ 239 (CCPA 1943). A seasonable challenge constitutes a demand for evidence made as soon as practicable during prosecution. Thus, applicant is charged with rebutting the well-known statement in the **next reply** after the Office action in which the well known statement was made.

Contact/Status Information

36. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Roy M. Punnoose** whose telephone number is **571-272-2427.** The examiner can normally be reached on 9:00 AM - 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, **Gregory J. Toatley, Jr.** can be reached on **571-272-2800 ext.77.** The fax phone number for the organization where this application or proceeding is assigned is **571-273-8300.**

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

January 23, 2006

Roy M. Punnoose
Patent Examiner
Art Unit 2877